

## Patent claims

1. Measuring arrangement for testing workpieces, having at least one optical fibre  
5 (11, 12, 13, 14, 15, 16, 17, 18) assigned to a workpiece (10), in which the or each optical fibre (11, 12, 13, 14, 15, 16, 17, 18) is designed as a Bragg grating sensor, and in which the or each optical fibre (11, 12, 13, 14, 15, 16, 17, 18) is arranged in the region of a surface of the workpiece.
- 10 2. Arrangement according to Claim 1, characterized in that the or each optical fibre (11, 12, 13, 14, 15, 16, 17, 18) designed as a Bragg grating sensor is mounted, in particular bonded, directly on the surface of the workpiece (10).
- 15 3. Arrangement according to Claim 1, characterized in that the or each optical fibre (11, 12, 13, 14, 15, 16, 17, 18) designed as a Bragg grating sensor is integrated in the surface of the workpiece (10).
4. Arrangement according to Claim 3, characterized in that introduced into the  
20 surface of the workpiece (10) are recesses whose breadth and depth are matched to the diameter of the optical fibres (11, 12, 13, 14, 15, 16, 17, 18) designed as Bragg grating sensors, and in that an optical fibre (11, 12, 13, 14, 15, 16, 17, 18) is arranged in the recesses.
5. Arrangement according to one or more of Claims 1 to 4, characterized in that a  
25 plurality of optical fibres (11, 12, 13, 14, 15, 16, 17, 18) designed as Bragg grating sensors are arranged in a different geometrical configuration on a surface of the workpiece (10).
6. Arrangement according to Claim 5, characterized in that the optical fibres (11, 12,  
30 13, 14, 15, 16, 17, 18) designed as Bragg grating sensors are arranged with different curvatures on the surface of the workpiece (10).

7. Arrangement according to Claim 5 or 6, characterized in that a first optical fibre (11, 18) designed as a Bragg grating sensor is arranged without curvature in the form of a straight line on the surface of the workpiece (10).
- 5 8. Arrangement according to one or more of Claims 5 to 7, characterized in that a second optical fibre (12, 17) designed as a Bragg grating sensor is arranged in the form of an angular straight line on the surface of the workpiece (10) in such a way that a first section of the fibre (12, 17) is angled off from a second section thereof.
- 10 9. Arrangement according to one or more of Claims 5 to 8, characterized in that a third optical fibre (13, 14, 15, 16) designed as a Bragg grating sensor is arranged on the surface of the workpiece (10) in such a way that the fibre (13, 14, 15, 16) has a curved section of approximately  $90^\circ$  and/or a curved section of approximately  $180^\circ$ , neighbouring sections of the corresponding optical fibre (13, 15 14, 15, 16) running approximately parallel to one another in the curved section of approximately  $180^\circ$ .
10. Arrangement according to one or more of Claims 1 to 9, characterized in that the workpiece (10) is designed as a dynamically loaded component, in particular as a 20 blade of a turbine or housing of a turbine.
11. Use of a measuring arrangement according to one or more of Claims 1 to 10 to determine the properties of a dynamically loaded component, in particular a blade of a turbine or a housing of a turbine.
- 25 12. Method for metrological instrumentation of workpieces, in which at least one optical fibre designed as a Bragg grating sensor is arranged in the region of a surface of the workpiece.
- 30 13. Method according to Claim 12, characterized in that the or each optical fibre designed as a Bragg grating sensor is mounted, in particular bonded, directly on the surface of the workpiece.

14. Method according to Claim 12, characterized in that the or each optical fibre designed as a Bragg grating sensor is integrated in the surface of the workpiece, recesses being introduced into the surface of the workpiece whose width and depth are matched to the diameter of the optical fibres designed as Bragg grating sensors, and in that an optical fibre is arranged in the recesses.

15. Method according to one or more of Claims 12 to 14, characterized in that a plurality of optical fibres designed as Bragg grating sensors are arranged in a different geometrical configuration, in particular with different curvatures, on a surface of the workpiece.